MEMORANDUM

TO: John Schofield and Craig Haas, U.S. EPA

FROM: ERG

DATE: 3 November 2015

SUBJECT: **Analytical Results – Phillips 66 Long Beach Refineries**

1. INTRODUCTION

This memorandum summarizes the analytical results for samples collected on August 27 and 28, 2015 during a sampling trip to two Phillips 66 petroleum refineries in Long Beach, California. All native samples were analyzed for the following:

- Toxicity Characteristic Leaching Procedure (TCLP) and total metals to include the target analyte list (TAL) metals;
- TCLP and total semivolatile organic compounds (SVOCs);
- TCLP and total volatile organic compounds (VOCs);
- Total petroleum hydrocarbons, including diesel range organics, oil range organics, and gas range organics;
- pH; and
- Flash Point.

Table 1 identifies the sample locations and types of analyses. Please note that all tables are located at the end of this memorandum. Attachment A contains photographs of the sampling points.

Eight of the waste samples collected at the facility were solid samples and seven were liquid samples. ERG collected the following blanks:

- SP-6 - Field Blank at Wilmington;
- SP-14- Field Blank at Carson; and
- SP-15 - Equipment Blank

ERG collected field duplicates to verify the reproducibility of the laboratory's results. ERG compared the results for the field duplicates to the native sample and identified the following analytes with a relative percent difference (RPD) of greater than 25 percent in the liquid samples (RPD in parenthesis):

- Total aluminum (33.3 percent);
- Total copper (95.7 percent);
- Total iron (57.10 percent);
- Total lead (66.7 percent);
- Total magnesium (37.0 percent);
- Total manganese (138.8 percent); and
- TCLP mercury (184 percent);

None of the analytes in the solid sample duplicate exceeded RPD criteria. Therefore, the above exceedances are likely due to the heterogeneity of the sample used for liquid duplicate analysis (the Carson pond water outfall).

ERG collected field blanks at two different locations and one equipment blank to verify that environmental conditions, sampling procedures or sampling equipment did not contaminate the samples. As shown in Tables 9 and 15, only diesel range organics, oil range organics, manganese, and zinc were detected above reporting limits. In general, these analytes were detected at low levels relative to the native samples and were not flagged as analytes of interest due to screening level exceedances in the native samples.

Attachment B contains additional discussion on the laboratory's quality assurance and quality control analyses. Information on the exchange of samples and laboratory analysis by Pace Analytical is provided in the chain-of-custody forms in Attachment C at the end of this memorandum.

Based on the results of ERG's quality control analysis, and the information in Attachment B, ERG determined that the sampling data described in this sample summary are acceptable for use.

2. TCLP RESULTS

The laboratory prepared TCLP leachates using the complete TCLP Extraction Procedure (EPA Method 1311). Analytes are only discussed in this section if analytical results showed an exceedance of either the limits in the toxicity characteristic (TCLP limits) or the universal treatment standards.

2.1 TCLP Metal Results

Table 2 presents the results of the TCLP metal analyses for solids and provides the TCLP limits and nonwastewater universal treatment standards (NUTS) for comparison. Table 3 presents the results of the TCLP metal analyses for liquids and provides the TCLP limits for comparison.

The Tank 42 Solids sample (SP-7) and the sediment under the pond outfall sample (SP-13) exceeded the NUTS for zinc (8.7 and 7.3 mg/L, respectively, compared to a NUTS of 4.3 mg/L).

The Carson Selenium Plant liquid sample (SP-8), exceeded the TCLP limit for selenium (2.6 mg/L compared to a TCLP limit of 1.0 mg/L).

2.1 TCLP Semivolatile Organic Compounds Results

Table 4 summarizes the TCLP semivolatile organic compounds (SVOCs) results for solid samples and present the TCLP limit for comparison. Table 5 summarizes the TCLP SVOCs results for liquid samples and present the TCLP limits for comparison.

None of the samples collected exceeded TCLP limits for SVOCs.

2.1 TCLP Volatile Organic Compounds Results

Table 6 summarizes the TCLP volatile organic compounds (VOCs) results for solid samples and provides TCLP limits for comparison. Table 7 summarizes the TCLP VOCs results for liquid samples and provides TCLP limits for comparison.

None of the samples collected exceeded TCLP limits for VOCs.

3. TOTAL POLLUTANT RESULTS

3.1 Total Metals Results

Table 8 summarizes the total metals results for solid samples and provides EPA soil screening levels (SSL) for comparison. The following solid samples exceeded the SSL for arsenic (3 mg/kg):

- Tank 68 Grit (SP-1) (17.0 mg/kg);
- Sediment sample from Northwest Corner of Pond SBU-2 (SP-4) (7.6 mg/kg); and
- Tank 42 Solids (SP-7)(47.0 mg/kg).

The following solid samples exceeded the SSL for chromium[1] (6.3 mg/kg):

- Tank 68 Grit (SP-1) (37.6 mg/kg);
- Wilmington Selenium Plant solids (SP-3) (7.6 mg/kg);
- Sediment sample from Northwest Corner of Pond SBU-2 (SP-4) (31.7 mg/kg); and
- Sediment sample from Souhwest Corner of Pond SBU-2 (SP-5) (12.6 mg/kg)
- Tank 42 Solids (SP-7)(47.0 mg/kg); and
- Sediment from under pond outfall (SP-13) (26 mg/kg).

The Tank 42 Solids sample (SP-7) equaled the SSL for cobalt (35.0 compared to an SSL of 35 mg/kg).

The Tank 42 Solids sample (SP-7) equaled the SSL for iron (143,000 compared to an SSL of 35.7 mg/kg).

[1] Conservative comparison was conducted between sampling data and SSL for hexavalent chromium.

Table 9 summarizes the total metals results for solid samples and provides wastewater universal treatment standards (WUTS) for comparison.

The Wilmington Selenium Plant liquid sample exceeded the WUTS for zinc (114 mg/L compared to a WUTS of 2.61 mg/L.

3.2 Total Semivolatile Organic Compounds Results

Table 10 summarizes the total SVOCs results for solids samples and provides SSLs and NUTS for comparison. Table 11 summarizes the total SVOCs results for liquid samples and provides WUTS for comparison.

No samples exceeded screening levels for total SVOCs.

3.3 Total Volatile Organic Compounds Results

Table 12 summarizes the total VOCs results for solids samples and presents SSLs and NUTS for comparison. Table 13 summarizes the total VOCs results for liquid samples and presents WUTS for comparison.

No samples exceeded screening levels for total VOCs.

3.4 TPH Results

Table 14 summarizes total petroleum hydrocarbon results for solid samples and Table 15 summarizes TPH results for liquid samples.

The sediment from under the pond outfall (SP-13) exhibited a diesel range organics (DRO) concentration of 723 mg/kg, and an oil range organics (ORO) concentration of 1,270 mg/kg.

These analytes were also detected, albeit at much lower levels, in the equipment blank (SP-15) (0.43 mg/l DRO and 0.84 mg/kg ORO).

4. pH Results

Table 16 summarizes the pH results for liquid samples.

None of the samples exceeded the threshold characteristic for corrosivity (compared to the threshold for corrosivity of 2<pH<12.5 S.U).

5. Flash Point Results

Table 17 summarizes the flash point results for the Carson pond water samples.

Neither sample exceeded the threshold characteristic for ignitability (compared to the threshold for ignitability of <60°F).

Table 1. Sample Identification

Sample ID	Sampling Point Location	Sample Description	Date	Media	Analysis
Wilmington Refinery					
SP-1	Tank 68 Grit N 33.76959 W 118.28282	Grit sample collected from roll-off container in 90-day storage area.	8/27/2015, 09:48	Solid	• Metals (TCLP & Total) • Semivolatiles (TCLP & Total) • Volatiles (TCLP & Total)
SP-2	Selenium Plant Liquid N 33.77541 W 118.28604	Gray liquid collected beneath roll-off bin in selenium plant. Field pH: 3.79 Standard Units Temperature: 30.4 ºCelsius	8/27/2015, 11:23	Liquid	• Metals (TCLP & Total) • Semivolatiles (TCLP & Total) • Volatiles (TCLP & Total) • pH
SP-3	Selenium Plant Solids N 33.77541 W 118.28604	Homogenous sludge taken from roll-off container in selenium plant.	8/27/2015, 11:23	Solid	• Metals (TCLP & Total) • Semivolatiles (TCLP & Total) • Volatiles (TCLP & Total)
SP-4	Sediment from Northwest Corner of SBU-2 Pond N 33.77557 W 118.28358	Dry limestone gravel like material.	8/27/2015 14:51	Solid	• Metals (TCLP & Total) • Semivolatiles (TCLP & Total) • Volatiles (TCLP & Total)
SP-5	Sediment from Southwest Corner of SBU-2 Pond N 33.77480 W 113.28339	Dry limestone gravel like material.	8/27/2015 15:10	Solid	• Metals (TCLP & Total) • Semivolatiles (TCLP & Total) • Volatiles (TCLP & Total)
SP-6	Field Blank - Near SBU-2 Pond	Distilled water.	8/27/2015 15:31	Liquid	• Metals (TCLP & Total) • Semivolatiles (TCLP & Total) • Volatiles (TCLP & Total)
Carson Refinery					
SP-7	Tank 42 Solids from Drums N 33.80624 W 113.24219	Black, moist, homogenous solids with approximately 20 to 30 percent moisture.	8/27/2015 17:59	Solid	• Metals (TCLP & Total) • Semivolatiles (TCLP & Total) • Volatiles (TCLP & Total) • pH
SP-8	Selenium Plant Liquid	Collected from ground inside curb. Water with light sheen and black solids. Field pH: 2.52 Standard Units Temperature: 31.1 ºCelsius	8/27/2015 15:16	Liquid	• Metals (TCLP & Total) • Semivolatiles (TCLP & Total) • Volatiles (TCLP & Total)
SP-9	Petroleum coke	Collected from shaker inside of coke processing building. Black and granular material.	8/27/2015 18:55	Solid	• Metals (TCLP & Total) • Semivolatiles (TCLP & Total) • Volatiles (TCLP & Total)
SP-10	Duplicate of SP-9				
SP-11	Pond Water Outfall N 33.80434 W 118.24201	Clear liquid. Field pH: 9. 09 Standard Units Temperature > 50 ºCelsius	8/28/2015 9:13	Liquid	• Metals (TCLP & Total) • Semivolatiles (TCLP & Total) • Volatiles (TCLP & Total) • TPH • pH, Flash Point
SP-12	Pond Water Outfall Duplicate N 33.80434 W 118.24201	Clear liquid.	8/28/2015 10:48	Liquid	• Metals (TCLP & Total) • Semivolatiles (TCLP & Total) • Volatiles (TCLP & Total) • TPH • pH, Flash Point
SP-13	Sediment Under Pond Outfall N 33.80434 W 118.24201	Thin layer of black oily material with brownish fine sand underneath.	8/28/2015 10:20	Solid	• Metals (TCLP & Total) • Semivolatiles (TCLP & Total) • Volatiles (TCLP & Total)
SP-14	Field Blank - Near SP- 12 & 13	Distilled water.	8/28/2015 10:46	Liquid	• Metals (TCLP & Total) • Semivolatiles (TCLP & Total) • Volatiles (TCLP & Total) • TPH
SP-15	Equipment Blank	Distilled water.	8/28/2015 13:30	Liquid	• Metals (TCLP & Total) • Semivolatiles (TCLP & Total) • Volatiles (TCLP & Total) • TPH

Table 2. Summary of TCLP Metal Results – Solid Samples

Analyte	Sample ID								Reporting Limit[a]	TCLP Limit[b]	NUTS[c]	Units	Method
	SP-1	SP-3	SP-4	SP-5	SP-7	SP-9	SP-10	SP-13					
Aluminum	ND	ND	ND	ND	ND	ND	ND	ND	2.0	n/a	n/a	mg/L	1311/6010
Antimony	ND	ND	ND	ND	ND	ND	ND	ND	2.0	n/a	1.15	mg/L	1311/6010
Arsenic	ND	ND	ND	ND	ND	ND	ND	ND	0.20	5.0	5.0	mg/L	1311/6010
Barium	ND	ND	ND	ND	ND	ND	ND	ND	2.0	100.0	21	mg/L	1311/6010
Beryllium	ND	ND	ND	ND	ND	ND	ND	ND	0.20	n/a	1.22	mg/L	1311/6010
Cadmium	ND	ND	ND	ND	ND	ND	ND	ND	0.10	1.0	0.11	mg/L	1311/6010
Calcium[d]	17.7 B	5.7	849	476	61.2	2.0 B	ND	175	2.0	n/a	n/a	mg/L	1311/6010
Chromium	ND	ND	ND	ND	ND	ND	ND	ND	0.20	5.0	0.6	mg/L	1311/6010
Cobalt	ND	ND	ND	ND	ND	ND	ND	ND	0.20	n/a	n/a	mg/L	1311/6010
Copper	1.2	ND	ND	ND	ND	ND	ND	0.51	0.20	n/a	n/a	mg/L	1311/6010
Iron	7.2	3.3	1.3	ND	167	ND	ND	ND	1.0	n/a	n/a	mg/L	1311/6010
Lead	ND	ND	ND	ND	ND	ND	ND	ND	0.20	5.0	0.75	mg/L	1311/6010
Magnesium	ND	ND	56.5	28.7	3.2	ND	ND	13.3	2.0	n/a	n/a	mg/L	1311/6010
Manganese	0.31	ND	3.8	2.4	2.3	ND	ND	1.0	0.13	n/a	n/a	mg/L	1311/6010
Mercury	0.00025	0.0063	0.00023 B	0.00024 B	0.0018	ND	ND	ND	0.00020	0.2	0.025	mg/L	1311/7470
Nickel	ND	ND	ND	ND	0.22	ND	ND	ND	0.20	n/a	11	mg/L	1311/6010
Potassium	ND	ND	9.2	4.5	3.2	ND	ND	2.2	2.0	n/a	n/a	mg/L	1311/6010
Selenium	ND	ND	ND	ND	ND	ND	ND	ND	0.20	1.0	5.7	mg/L	1311/6010
Silver	ND	ND	ND	ND	ND	ND	ND	ND	0.20	5.0	0.14	mg/L	1311/6010
Thallium[d]	ND	ND	ND	ND	ND	ND	ND	ND	0.040	n/a	0.20	mg/L	1311/6010
Vanadium	ND	ND	ND	ND	ND	ND	ND	ND	0.20	n/a	1.6	mg/L	1311/6010
Zinc	1.3	0.40	ND	0.55	8.7	ND	ND	7.3	0.20	n/a	4.3	mg/L	1311/6010

Underlined values indicate an exceedance of the Nonwastewater Universal Treatment Standard.
n/a – No applicable limit for analyte.
ND – Analyte not detected.
B: Analyte was detected in the associated method blank.
[a] Maximum reporting limit listed. Some of the samples were analyzed at a lower reporting limit.
[b] See 40 CFR 261.24.
[c] Nonwastewater Universal Treatment Standard. See 40 CFR § 268.48.
[d] Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample recovery.

Table 3. Summary of TCLP Metal Results – Liquid Samples

Analyte	Sample ID				Reporting Limit[a]	TCLP Limit[b]	Units	Method
	SP-2	SP-8	SP-11	SP-12				
Aluminum	6.0	ND	2.8	ND	2.0	n/a	mg/L	1311/6010
Antimony	ND	ND	ND	ND	2.0	n/a	mg/L	1311/6010
Arsenic	ND	ND	ND	ND	0.20	5.0	mg/L	1311/6010
Barium	ND	ND	ND	ND	2.0	100.0	mg/L	1311/6010
Beryllium	ND	ND	ND	ND	0.20	n/a	mg/L	1311/6010
Cadmium	ND	ND	ND	ND	0.10	1.0	mg/L	1311/6010
Calcium[c]	241	17.1	6.3	8.3	2.0	n/a	mg/L	1311/6010
Chromium	ND	ND	ND	ND	0.20	5.0	mg/L	1311/6010
Cobalt	ND	ND	ND	ND	0.20	n/a	mg/L	1311/6010
Copper	ND	ND	ND	ND	0.20	n/a	mg/L	1311/6010
Iron	77.8	15.8	1.8	ND	1.0	n/a	mg/L	1311/6010
Lead	ND	ND	ND	ND	0.20	5.0	mg/L	1311/6010
Magnesium	23.7	3.5	2.2	2.2	2.0	n/a	mg/L	1311/6010
Manganese	5.8	0.41	ND	ND	0.13	n/a	mg/L	1311/6010
Mercury	0.0014	0.00037	0.0048	ND	0.00020	0.2	mg/L	1311/6010
Nickel	0.94	0.25	ND	ND	0.20	n/a	mg/L	1311/6010
Potassium	23.2	ND	ND	ND	2.0	n/a	mg/L	1311/6010
Selenium	0.38	**2.6**	ND	ND	0.20	1.0	mg/L	1311/6010
Silver	ND	ND	ND	ND	0.20	5.0	mg/L	1311/6010
Thallium[c]	ND	ND	ND	ND	0.040	n/a	mg/L	1311/6010
Vanadium	ND	ND	ND	ND	0.20	n/a	mg/L	1311/6010
Zinc	83.6	3.0	ND	ND	0.20	n/a	mg/L	1311/6010

Bold and underlined values indicate an exceedance of the TCLP Limit.
n/a – No applicable limit for analyte.
ND – Analyte not detected.
[a] Maximum reporting limit listed. Some of the samples were analyzed at a lower reporting limit.
[b] See 40 CFR 261.24.
[c] Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample LCS recovery.

Table 4. Summary of TCLP Semivolatile Organic Compound Results – Solid Samples

Analyte	Sample ID							Reporting Limit[a]	TCLP Limit[b]	Units	Method
	SP-1	SP-4	SP-5	SP-7	SP-9	SP-10	SP-13				
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	100	7,500	µg/L	1311/8270
2,4,5-Trichlorophenol[d]	ND	ND	ND	ND	ND	ND	ND	100	400,000	µg/L	1311/8270
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	100	2,000	µg/L	1311/8270
2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	ND	100	n/a	µg/L	1311/8270
2,4-Dinitrotoluene	ND	ND	ND	ND	ND	ND	ND	100	130	µg/L	1311/8270
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	100	n/a	µg/L	1311/8270
2-Methylphenol(o-Cresol)	ND	ND	ND	ND	ND	ND	ND	100	200,000	µg/L	1311/8270
3&4-Methylphenol(m&p Cresol)	ND	ND	ND	ND	ND	ND	ND	100	200,000[c]	µg/L	1311/8270
4,6-Dinitro-2-methylphenol	ND	ND	ND	ND	ND	ND	ND	100	n/a	µg/L	1311/8270
4-Chloro-3-methylphenol	ND	ND	ND	ND	ND	ND	ND	100	n/a	µg/L	1311/8270
Hexachloro-1,3-butadiene	ND	ND	ND	ND	ND	ND	ND	100	500	µg/L	1311/8270
Hexachlorobenzene	ND	ND	ND	ND	ND	ND	ND	100	130	µg/L	1311/8270
Hexachloroethane	ND	ND	ND	ND	ND	ND	ND	100	3,000	µg/L	1311/8270
N-Nitrosodiphenylamine	ND	ND	ND	ND	ND	ND	ND	100	n/a	µg/L	1311/8270
Nitrobenzene	ND	ND	ND	ND	ND	ND	ND	100	2,000	µg/L	1311/8270
Pyridine[e]	ND	ND	ND	ND	ND	ND	ND	100	5,000	µg/L	1311/8270

n/a – No applicable limit for analyte.
ND – Analyte not detected.
[a] Maximum reporting limit listed. Some of the samples were analyzed at a lower reporting limit.
[b] See 40 CFR 261.24
[c] TCLP limit is 200,000 µg/L for each analyte (m- & p-Cresol).
[d] RPD value was outside control limits.
[e] Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample recovery.

Table 5. Summary of TCLP Semivolatile Organic Compound Results – Liquid Samples

Analyte	Sample ID		Reporting Limit[a]	TCLP Limit[b]	Units	Method
	SP-11	SP-12				
1,4-Dichlorobenzene	ND	ND	100	7,500	µg/L	1311/8270
2,4,5-Trichlorophenol	ND	ND	100	400,000	µg/L	1311/8270
2,4,6-Trichlorophenol	ND	ND	100	2,000	µg/L	1311/8270
2,4-Dimethylphenol	ND	ND	100	n/a	µg/L	1311/8270
2,4-Dinitrotoluene	ND	ND	100	130	µg/L	1311/8270
2-Chlorophenol	ND	ND	100	n/a	µg/L	1311/8270
2-Methylphenol(o-Cresol)	ND	ND	100	200,000	µg/L	1311/8270
3&4-Methylphenol(m&p Cresol)	ND	ND	100	200,000[c]	µg/L	1311/8270
4,6-Dinitro-2-methylphenol	ND	ND	100	n/a	µg/L	1311/8270
4-Chloro-3-methylphenol	ND	ND	100	n/a	µg/L	1311/8270
Hexachloro-1,3-butadiene	ND	ND	100	500	µg/L	1311/8270
Hexachlorobenzene	ND	ND	100	130	µg/L	1311/8270
Hexachloroethane	ND	ND	100	3,000	µg/L	1311/8270
N-Nitrosodiphenylamine	ND	ND	100	n/a	µg/L	1311/8270
Nitrobenzene	ND	ND	100	2,000	µg/L	1311/8270
Pyridine	ND	ND	100	5,000	µg/L	1311/8270

n/a – No applicable limit for analyte.
ND – Analyte not detected.
[a] Maximum reporting limit listed. Some of the samples were analyzed at a lower reporting limit.
[b] See 40 CFR 261.24.
[c] TCLP limit is 200,000 µg/L for each analyte (m- & p-Cresol).

Table 6. Summary of TCLP Volatile Organic Compound Results – Solid Samples

Analyte	Sample ID						Reporting Limit[a]	TCLP Limit[b]	Units	Method
	SP-1	SP-5	SP-7	SP-9	SP-10	SP-13				
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	0.10	0.7	mg/L	1311/8260
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	0.10	n/a	mg/L	1311/8260
1,2-Dichloroethane	ND	ND	ND	0.90	ND	ND	0.10	0.5	mg/L	1311/8260
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	0.10	n/a	mg/L	1311/8260
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	0.10	7.5	mg/L	1311/8260
2-Butanone (MEK)[c]	ND	ND	ND	ND	ND	ND	0.20	200	mg/L	1311/8260
Benzene [c]	ND	ND	ND	ND	ND	ND	0.10	0.5	mg/L	1311/8260
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	0.10	0.5	mg/L	1311/8260
Chlorobenzene	ND	ND	ND	ND	ND	ND	0.10	100.0	mg/L	1311/8260
Chloroform	ND	ND	ND	ND	ND	ND	0.10	6.0	mg/L	1311/8260
Tetrachloroethene	ND	ND	ND	ND	ND	ND	0.10	0.7	mg/L	1311/8260
Trichloroethene	ND	ND	ND	ND	ND	ND	0.10	0.5	mg/L	1311/8260
Vinyl chloride	ND	ND	ND	ND	ND	ND	0.10	0.2	mg/L	1311/8260

n/a – No applicable limit for analyte.
ND – Analyte not detected.
[a] Maximum reporting limit listed. Some of the samples were analyzed at a lower reporting limit.
[b] See 40 CFR 261.24.
[c] Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample recovery.

Table 7. Summary of TCLP Volatile Organic Compound Results – Liquid Samples

Analyte	Sample ID			Reporting Limit[a]	TCLP Limit[b]	Units	Method
	SP-4	SP-11	SP-12				
1,1-Dichloroethene	ND	ND	ND	0.10	0.7	mg/L	1311/8260
1,2-Dichlorobenzene	ND	ND	ND	0.10	n/a	mg/L	1311/8260
1,2-Dichloroethane	ND	ND	ND	0.10	0.5	mg/L	1311/8260
1,3-Dichlorobenzene	ND	ND	ND	0.10	n/a	mg/L	1311/8260
1,4-Dichlorobenzene	ND	ND	ND	0.10	7.5	mg/L	1311/8260
2-Butanone (MEK)	ND	ND	ND	0.20	200	mg/L	1311/8260
Benzene	ND	ND	ND	0.10	0.5	mg/L	1311/8260
Carbon tetrachloride	ND	ND	ND	0.10	0.5	mg/L	1311/8260
Chlorobenzene	ND	ND	ND	0.10	100.0	mg/L	1311/8260
Chloroform	ND	ND	ND	0.10	6.0	mg/L	1311/8260
Tetrachloroethene	ND	ND	ND	0.10	0.7	mg/L	1311/8260
Trichloroethene	ND	ND	ND	0.10	0.5	mg/L	1311/8260
Vinyl chloride	ND	ND	ND	0.10	0.2	mg/L	1311/8260

n/a – No applicable limit for analyte.
ND – Analyte not detected.
[a] Maximum reporting limit listed. Some of the samples were analyzed at a lower reporting limit.
[b] See 40 CFR 261.24.

Table 8. Summary of Total Metals Results – Solid Samples

Analyte	Sample ID								Reporting Limit[a]	Soil Screening Level[b]	Units	Method
	SP-1	SP-3	SP-4	SP-5	SP-7	SP-9	SP-10	SP-13				
Aluminum[c]	21,000	86.2	6,670	2,830	5,900	ND	ND	3,760	19.6	1,100,000	mg/kg	6010
Antimony[c]	ND	ND	ND	ND	3.6	ND	ND	ND	2.9	470	mg/kg	6010
Arsenic	**17.0**	1.6	**7.6**	2.8	**47.0**	ND	ND	2.7	0.98	3	mg/kg	6010
Barium[c]	614	ND	188	64.4	45.4	ND	ND	61.9	19.6	220,000	mg/kg	6010
Beryllium	ND	ND	ND	ND	ND	ND	ND	ND	0.49	230	mg/kg	6010
Cadmium	ND	ND	0.67	ND	ND	ND	ND	0.58	3.6	98	mg/kg	6010
Calcium[c]	84,300	ND	71,100	13,400	8,880	ND	ND	5,990	943	n/a	mg/kg	6010
Chromium	**37.6**	**7.6**	**31.7**	**12.6**	**28.6**	ND	ND	**26**	0.98	6.3[d]	mg/kg	6010
Cobalt	18.0	2.0	6.0	3.1	**35.0**	ND	ND	8.1	0.98	35	mg/kg	6010
Copper	1,560	9.4	84.2	28.5	3,310	ND	ND	223	7.1	47,000	mg/kg	6010
Iron[c]	80,100	12,700	24,200	7,300	**143,000**	34.6	19.2	17,400	35.7	82,000	mg/kg	6010
Lead[c]	51.0	0.48	33.2	18.8	56.6	ND	ND	94.2	3.6	800	mg/kg	6010
Magnesium[c]	11,000	ND	3,750	2,530	1,900	ND	ND	3300	98	n/a	mg/kg	6010
Manganese[c]	1,410	4.8	376	181	204	ND	ND	147	0.98	2,600	mg/kg	6010
Mercury	ND[c]	3.1[c]	0.96[c]	0.18[c]	0.058	ND	ND	0.43	0.018	35[e]	mg/kg	7471
Nickel	18.7	3.2	40.9	9.5	17.5	15.1	30.3	20.8	3.9	2,200	mg/kg	6010
Potassium[c]	2,330	ND	1,520	775	558	ND	ND	784	98	n/a	mg/kg	6010
Selenium	ND	489	7.2	2.3	3.7	ND	ND	ND	2	580	mg/kg	6010
Silver	1.1	ND	ND	ND	1.1	ND	ND	ND	0.98	580	mg/kg	6010
Sodium	447	169	1,050	938	426	ND	ND	192	98	n/a	mg/kg	6010
Thallium[c]	ND	ND	ND	ND	ND	ND	ND	ND	4.7	1.2	mg/kg	6010
Vanadium	59.5	25.7	114	42.3	13.8	36.1	68.9	15.3	4.9	580	mg/kg	6010
Zinc[c]	78.0	6.1	882	391	3,240	ND	ND	1,180	14.3	35,000	mg/kg	6010

Bold and underlined values indicate an exceedance of the Soil Screening Level.
n/a – No applicable limit for analyte.
ND – Analyte not detected.
[a] Maximum reporting limit listed. Some of the samples were analyzed at a lower reporting limit.
[b] November 2014 EPA Regional Screening Level Summary Table industrial soil screening levels with a Target Hazard Quotient of 0.1.
[c] Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample recovery.
[d] Soil screening level is for hexavalent chromium.
[e] Soil screening level is for Mercuric chloride and other mercury salts.

Table 9. Summary of Total Metals Results – Liquid Samples

Analyte	Sample ID						Reporting Limit[a]	WUTS[b]	Units	Method
	SP-2	SP-6	SP-11	SP-12	SP-14	SP-15				
Aluminum [c]	6.9	ND	ND	0.10	ND	ND	0.10	n/a	mg/L	6020
Antimony [c]	ND	ND	ND	ND	ND	ND	0.0010	1.9	mg/L	6020
Arsenic	0.0063	ND	ND	ND	ND	ND	0.0010	1.4	mg/L	6020
Barium [c]	0.05	ND	0.0093	0.010	ND	ND	0.0010	1.2	mg/L	6020
Beryllium	ND	ND	ND	ND	ND	ND	0.0010	0.82	mg/L	6020
Cadmium	0.0059	ND	ND	ND	ND	ND	0.0010	0.69	mg/L	6020
Calcium [c]	274	ND	9.0	9.6	ND	ND	0.10	n/a	mg/L	6020
Chromium	0.049	ND	ND	ND	ND	ND	0.0010	2.77	mg/L	6020
Cobalt	0.035	ND	ND	ND	ND	ND	0.0010	n/a	mg/L	6020
Copper	0.34	ND	ND	0.0085	ND	ND	0.0030	n/a	mg/L	6020
Iron [c]	111	ND	ND	0.18	ND	ND	0.10	n/a	mg/L	6020
Lead [c]	0.0091	ND	ND	0.0020	ND	ND	0.0010	0.69	mg/L	6020
Magnesium [c]	26.9	ND	2.2	3.2	ND	ND	0.10	n/a	mg/L	6020
Manganese [c]	7.0	0.0010	0.0013	0.0072	ND	0.0012	0.0010	n/a	mg/L	6020
Mercury	1.5	0.3	ND	ND	ND	ND	0.0010	150	µg/L	7470
Nickel	0.95	ND	ND	ND	ND	ND	0.0010	3.98	mg/L	6020
Potassium [c]	23.6	ND	1.6	1.6	ND	ND	0.10	n/a	mg/L	6020
Selenium	0.45	ND	ND	ND	ND	ND	0.0010	0.82	mg/L	6020
Silver	ND	ND	ND	ND	ND	ND	0.00050	0.43	mg/L	6020
Sodium	778	ND	72.3	72.0	ND	ND	0.10	n/a	mg/L	6020
Thallium [c]	ND	ND	ND	ND	ND	ND	0.00050	1.4	mg/L	6020
Vanadium	0.016	ND	ND	ND	ND	ND	0.0010	4.3	mg/L	6020
Zinc [c]	**114**	0.013	ND	0.060	ND	ND	0.0050	2.61	mg/L	6020

Bold and underlined values indicate an exceedance of the Wastewater Universal Treatment Standard.
n/a – No applicable limit for analyte.
ND – Analyte not detected.
[a] Maximum reporting limit listed. Some of the samples were analyzed at a lower reporting limit.
[b] Wastewater Universal Treatment Standard. See 40 CFR § 268.48.
[c] Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample recovery.

Table 10. Summary of Total Semivolatile Organic Compound Results – Solid Samples

Analyte	Sample ID							Reporting Limit[a]	Soil Screening Level[b]	NUTS[c]	Units	Method
	SP-1	SP-4	SP-5	SP-7	SP-9	SP-10	SP-13					
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	0.33	26	19	mg/kg	8270
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	0.33	930	6.0	mg/kg	8270
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	0.33	n/a	6.0	mg/kg	8270
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	0.33	11	6.0	mg/kg	8270
2,2'-Oxybis(1-chloropropane)	ND	ND	ND	ND	ND	ND	ND	0.33	n/a	n/a	mg/kg	8270
2,4,5-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	0.33	8,200	7.4	mg/kg	8270
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	0.33	86	7.4	mg/kg	8270
2,4-Dichlorophenol	ND	ND	ND	ND	ND	ND	ND	0.33	250	14	mg/kg	8270
2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	ND	0.33	1,600	14	mg/kg	8270
2,4-Dinitrophenol	ND	ND	ND	ND	ND	ND	ND	0.33	160	160	mg/kg	8270
2,4-Dinitrotoluene	ND	ND	ND	ND	ND	ND	ND	0.33	7.4	140	mg/kg	8270
2,6-Dinitrotoluene	ND	ND	ND	ND	ND	ND	ND	0.33	1.5	28	mg/kg	8270
2-Chloronaphthalene	ND	ND	ND	ND	ND	ND	ND	0.33	n/a	5.6	mg/kg	8270
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	0.33	580	5.7	mg/kg	8270
2-Methylnaphthalene	ND	ND	ND	ND	ND	ND	ND	0.33	300	n/a	mg/kg	8270
2-Methylphenol(o-Cresol)	ND	ND	ND	ND	ND	ND	ND	0.33	4,100	5.6	mg/kg	8270
2-Nitroaniline	ND	ND	ND	ND	ND	ND	ND	0.33	800	14	mg/kg	8270
2-Nitrophenol	ND	ND	ND	ND	ND	ND	ND	0.33	n/a	13	mg/kg	8270
3&4-Chloroaniline	ND	ND	ND	ND	ND	ND	ND	0.33	11	16	mg/kg	8270
3&4-Methylphenol(m&p cresol)	ND	ND	ND	ND	ND	ND	ND	0.33	8,200	5.6[d]	mg/kg	8270
3,3'-Dichlorobenzidine	ND	ND	ND	ND	ND	ND	ND	0.33	5.1	n/a	mg/kg	8270
3-Nitroaniline	ND	ND	ND	ND	ND	ND	ND	0.33	n/a	n/a	mg/kg	8270
4,6-Dinitro-2-methylphenol	ND	ND	ND	ND	ND	ND	ND	0.33	66	n/a	mg/kg	8270
4-Bromophenylphenyl ether	ND	ND	ND	ND	ND	ND	ND	0.33	n/a	15	mg/kg	8270
4-Chloro-3-methylphenol	ND	ND	ND	ND	ND	ND	ND	0.33	8,200	14	mg/kg	8270
4-Nitroaniline	ND	ND	ND	ND	ND	ND	ND	0.33	110	28	mg/kg	8270
4-Nitrophenol	ND	ND	ND	ND	ND	ND	ND	0.33	n/a	29	mg/kg	8270
Acenaphthene	ND	ND	ND	ND	ND	ND	ND	0.33	4,500	3.4	mg/kg	8270
Acenaphthylene	ND	ND	ND	ND	ND	ND	ND	0.33	n/a	3.4	mg/kg	8270
Anthracene	ND	ND	ND	ND	ND	ND	ND	0.33	23,000	3.4	mg/kg	8270
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND	ND	0.33	2.9	3.4	mg/kg	8270
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	ND	0.33	0.29	3.4	mg/kg	8270

Table 10. Summary of Total Semivolatile Organic Compound Results – Solid Samples

Analyte	Sample ID							Reporting Limit[a]	Soil Screening Level[b]	NUTS[c]	Units	Method
	SP-1	SP-4	SP-5	SP-7	SP-9	SP-10	SP-13					
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	ND	ND	0.33	2.9	6.8	mg/kg	8270
Benzo(g,h,i)perylene	ND	ND	ND	ND	ND	ND	ND	0.33	n/a	1.8	mg/kg	8270
Benzo(k)fluoranthene	ND	ND	ND	ND	ND	ND	ND	0.33	29	6.8	mg/kg	8270
Benzoic acid	ND	ND	ND	ND	ND	ND	ND	0.33	330,000	n/a	mg/kg	8270
Benzyl alcohol	ND	ND	ND	1.4	ND	ND	ND	0.33	8,200	n/a	mg/kg	8270
Butylbenzylphthalate	ND	ND	ND	ND	ND	ND	ND	0.33	n/a	28	mg/kg	8270
Carbazole	ND	ND	ND	ND	ND	ND	ND	0.33	n/a	n/a	mg/kg	8270
Chrysene	ND	ND	ND	ND	ND	ND	ND	0.33	290	3.4	mg/kg	8270
Di-n-butyl phthalate	ND	ND	ND	ND	ND	ND	ND	0.33	820	28	mg/kg	8270
Di-n-octylphthalate	ND	ND	ND	ND	ND	ND	ND	0.33	820	28	mg/kg	8270
Dibenz(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	0.33	0.29	8.2	mg/kg	8270
Dibenzofuran	ND	ND	ND	ND	ND	ND	ND	0.33	100	n/a	mg/kg	8270
Diethylphthalate	ND	ND	ND	ND	ND	ND	ND	0.33	66,000	28	mg/kg	8270
Dimethylphthalate	ND	ND	ND	ND	ND	ND	ND	0.33	n/a	28	mg/kg	8270
Fluoranthene	ND	ND	ND	ND	ND	ND	ND	0.33	3,000	3.4	mg/kg	8270
Fluorene	ND	ND	ND	ND	ND	ND	ND	0.33	3,000	3.4	mg/kg	8270
Hexachloro-1,3-butadiene	ND	ND	ND	ND	ND	ND	ND	0.33	5.3	5.6	mg/kg	8270
Hexachlorobenzene	ND	ND	ND	ND	ND	ND	ND	0.33	0.96	10	mg/kg	8270
Hexachlorocyclopentadiene [M1]	ND	ND	ND	ND	ND	ND	ND	0.33	0.75	2.4	mg/kg	8270
Hexachloroethane	ND	ND	ND	ND	ND	ND	ND	0.33	8.0	30	mg/kg	8270
Indeno(1,2,3-cd)pyrene	ND	ND	ND	ND	ND	ND	ND	0.33	2.9	3.4	mg/kg	8270
Isophorone	ND	ND	ND	ND	ND	ND	ND	0.33	2,400	n/a	mg/kg	8270
N-Nitroso-di-n-propylamine	ND	ND	ND	ND	ND	ND	ND	0.33	0.33	n/a	mg/kg	8270
N-Nitrosodiphenylamine	ND	ND	ND	ND	ND	ND	ND	0.33	470	13	mg/kg	8270
Naphthalene	ND	ND	ND	ND	ND	ND	ND	0.33	17	5.6	mg/kg	8270
Nitrobenzene	ND	ND	ND	ND	ND	ND	ND	0.33	22	14	mg/kg	8270
Pentachlorophenol	ND	ND	ND	ND	ND	ND	ND	0.33	4	7.4	mg/kg	8270
Phenanthrene	ND	ND	ND	ND	ND	ND	ND	0.33	n/a	5.6	mg/kg	8270
Phenol	ND	ND	ND	ND	ND	ND	ND	0.33	25,000	6.2	mg/kg	8270
Pyrene	ND	ND	ND	ND	ND	ND	ND	0.33	2,300	8.2	mg/kg	8270
Pyridine	ND	ND	ND	ND	ND	ND	ND	0.33	120	16	mg/kg	8270
bis(2-Chloroethoxy)methane	ND	ND	ND	ND	ND	ND	ND	0.33	250	7.2	mg/kg	8270
bis(2-Chloroethyl) ether	ND	ND	ND	ND	ND	ND	ND	0.33	1.0	6.0	mg/kg	8270

Table 10. Summary of Total Semivolatile Organic Compound Results – Solid Samples

Analyte	Sample ID							Reporting Limit[a]	Soil Screening Level[b]	NUTS[c]	Units	Method
	SP-1	SP-4	SP-5	SP-7	SP-9	SP-10	SP-13					
bis(2-Ethylhexyl)phthalate	ND	ND	ND	ND	ND	ND	ND	0.33	160	28	mg/kg	8270

n/a – No applicable limit for analyte.
ND – Analyte not detected.
[a] Maximum reporting limit listed. Some of the samples were analyzed at a lower reporting limit.
[b] November 2014 EPA Regional Screening Level (RSL) Summary Table industrial soil screening levels with a Target Hazard Quotient of 0.1.
[c] Nonwastewater Universal Treatment Standard. See 40 CFR § 268.48.
[d] Screening level is for each individual analyte.

Table 11. Summary of Total Semivolatile Organic Compound Results – Liquid Samples

Analyte	Sample ID					Reporting Limit[a]	WUTS[b]	Units	Method
	SP-6	SP-11	SP-12	SP-14	SP-15				
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	10.0	55	µg/L	8270
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	10.0	88	µg/L	8270
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	10.0	36	µg/L	8270
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	10.0	90	µg/L	8270
2,2'-Oxybis(1-chloropropane)	ND	ND	ND	ND	ND	10.0	n/a	µg/L	8270
2,4,5-Trichlorophenol	ND	ND	ND	ND	ND	10.0	180	µg/L	8270
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	10.0	35	µg/L	8270
2,4-Dichlorophenol	ND	ND	ND	ND	ND	10.0	44	µg/L	8270
2,4-Dimethylphenol	ND	ND	ND	ND	ND	10.0	36	µg/L	8270
2,4-Dinitrophenol	ND	ND	ND	ND	ND	10.0	120	µg/L	8270
2,4-Dinitrotoluene	ND	ND	ND	ND	ND	10.0	320	µg/L	8270
2,6-Dinitrotoluene	ND	ND	ND	ND	ND	10.0	550	µg/L	8270
2-Chloronaphthalene	ND	ND	ND	ND	ND	10.0	55	µg/L	8270
2-Chlorophenol	ND	ND	ND	ND	ND	10.0	44	µg/L	8270
2-Methylnaphthalene	ND	ND	ND	ND	ND	10.0	n/a	µg/L	8270
2-Methylphenol(o-Cresol)	ND	ND	ND	ND	ND	10.0	110	µg/L	8270
2-Nitroaniline	ND	ND	ND	ND	ND	10.0	270	µg/L	8270
2-Nitrophenol	ND	ND	ND	ND	ND	10.0	28	µg/L	8270
3&4-Chloroaniline	ND	ND	ND	ND	ND	10.0	460[c]	µg/L	8270
3&4-Methylphenol(m&p cresol)	ND	ND	ND	ND	ND	10.0	770[d]	µg/L	8270
3,3'-Dichlorobenzidine	ND	ND	ND	ND	ND	10.0	n/a	µg/L	8270
3-Nitroaniline	ND	ND	ND	ND	ND	10.0	n/a	µg/L	8270
4,6-Dinitro-2-methylphenol	ND	ND	ND	ND	ND	10.0	280	µg/L	8270
4-Bromophenylphenyl ether	ND	ND	ND	ND	ND	10.0	55	µg/L	8270
4-Chloro-3-methylphenol	ND	ND	ND	ND	ND	10.0	18	µg/L	8270
4-Chlorophenylphenyl ether	ND	ND	ND	ND	ND	10.0	n/a	µg/L	8270
4-Nitroaniline	ND	ND	ND	ND	ND	10.0	28	µg/L	8270
4-Nitrophenol	ND	ND	ND	ND	ND	10.0	120	µg/L	8270
Acenaphthene	ND	ND	ND	ND	ND	10.0	59	µg/L	8270
Acenaphthylene	ND	ND	ND	ND	ND	10.0	59	µg/L	8270
Anthracene	ND	ND	ND	ND	ND	10.0	59	µg/L	8270
Benzo(a)anthracene	ND	ND	ND	ND	ND	10.0	59	µg/L	8270
Benzo(a)pyrene	ND	ND	ND	ND	ND	10.0	61	µg/L	8270
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	10.0	110	µg/L	8270
Benzo(g,h,i)perylene	ND	ND	ND	ND	ND	10.0	5.5	µg/L	8270
Benzo(k)fluoranthene	ND	ND	ND	ND	ND	10.0	110	µg/L	8270
Benzoic acid	ND	ND	ND	ND	ND	10.0	n/a	µg/L	8270
Benzyl alcohol	ND	ND	ND	ND	ND	10.0	n/a	µg/L	8270
Butylbenzylphthalate	ND	ND	ND	ND	ND	10.0	17	µg/L	8270
Carbazole	ND	ND	ND	ND	ND	10.0	n/a	µg/L	8270
Chrysene	ND	ND	ND	ND	ND	10.0	59	µg/L	8270
Di-n-butyl phthalate	ND	ND	ND	ND	ND	10.0	57	µg/L	8270
Di-n-octylphthalate	ND	ND	ND	ND	ND	10.0	17	µg/L	8270
Dibenz(a,h)anthracene	ND	ND	ND	ND	ND	10.0	55	µg/L	8270

Table 11. Summary of Total Semivolatile Organic Compound Results – Liquid Samples

Analyte	Sample ID					Reporting Limit[a]	WUTS[b]	Units	Method
	SP-6	SP-11	SP-12	SP-14	SP-15				
Dibenzofuran	ND	ND	ND	ND	ND	10.0	n/a	µg/L	8270
Diethylphthalate	ND	ND	ND	ND	ND	10.0	200	µg/L	8270
Dimethylphthalate	ND	ND	ND	ND	ND	10.0	47	µg/L	8270
Fluoranthene	ND	ND	ND	ND	ND	10.0	68	µg/L	8270
Fluorene	ND	ND	ND	ND	ND	10.0	59	µg/L	8270
Hexachloro-1,3-butadiene	ND	ND	ND	ND	ND	10.0	55	µg/L	8270
Hexachlorobenzene	ND	ND	ND	ND	ND	10.0	55	µg/L	8270
Hexachlorocyclopentadiene	ND	ND	ND	ND	ND	10.0	57	µg/L	8270
Hexachloroethane	ND	ND	ND	ND	ND	10.0	55	µg/L	8270
Indeno(1,2,3-cd)pyrene	ND	ND	ND	ND	ND	10.0	5.59	µg/L	8270
Isophorone	ND	ND	ND	ND	ND	10.0	n/a	µg/L	8270
N-Nitroso-di-n-propylamine	ND	ND	ND	ND	ND	10.0	400	µg/L	8270
N-Nitrosodiphenylamine	ND	ND	ND	ND	ND	10.0	920	µg/L	8270
Naphthalene	ND	ND	ND	ND	ND	10.0	59	µg/L	8270
Nitrobenzene	ND	ND	ND	ND	ND	10.0	68	µg/L	8270
Pentachlorophenol	ND	ND	ND	ND	ND	10.0	89	µg/L	8270
Phenanthrene	ND	ND	ND	ND	ND	10.0	59	µg/L	8270
Phenol	ND	ND	ND	ND	ND	10.0	39	µg/L	8270
Pyrene	ND	ND	ND	ND	ND	10.0	67	µg/L	8270
Pyridine	ND	ND	ND	ND	ND	10.0	14	µg/L	8270
bis(2-Chloroethoxy)methane	ND	ND	ND	ND	ND	10.0	36	µg/L	8270
bis(2-Chloroethyl) ether	ND	ND	ND	ND	ND	10.0	33	µg/L	8270
bis(2-Ethylhexyl)phthalate	ND	ND	ND	ND	ND	10.0	280	µg/L	8270

n/a – No applicable limit for analyte.
ND – Analyte not detected.
[a] Maximum reporting limit listed. Some of the samples were analyzed at a lower reporting limit.
[b] Wastewater Universal Treatment Standard. See 40 CFR § 268.48.

Table 12. Summary of Total Volatile Organic Compound Results – Solid Samples

Analyte	Sample ID							Reporting Limit[a]	Soil Screening Level[b]	NUTS[c]	Units	Method
	SP-1	SP-4	SP-5	SP-7	SP-9	SP-10	SP-13					
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	0.011	8.8	6.0	mg/kg	8260
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	0.011	3,600	6.0	mg/kg	8260
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	0.011	2.7	6.0	mg/kg	8260
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	0.011	0.63	6.0	mg/kg	8260
1,1,2-Trichlorotrifluoroethane	ND	ND	ND	ND	ND	ND	ND	0.011	17,000	30	mg/kg	8260
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	0.011	16	6.0	mg/kg	8260
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	0.011	100	6.0	mg/kg	8260
1,1-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	0.011	n/a	n/a	mg/kg	8260
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	0.011	93	n/a	mg/kg	8260
1,2,3-Trichloropropane	ND	ND	ND	ND	ND	ND	ND	0.011	0.11	30	mg/kg	8260
1,2,3-Trimethylbenzene	ND	ND	ND	0.044	ND	ND	ND	0.011	21	n/a	mg/kg	8260
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	0.011	26	19	mg/kg	8260
1,2,4-Trimethylbenzene	ND	ND	ND	0.084	ND	ND	ND	0.011	24	n/a	mg/kg	8260
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	ND	ND	ND	0.011	0.064	15	mg/kg	8260
1,2-Dibromoethane (EDB)	ND	ND	ND	ND	ND	ND	ND	0.011	0.16	15	mg/kg	8260
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	0.011	930	6.0	mg/kg	8260
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	0.011	2.0	6.0	mg/kg	8260
1,2-Dichloroethene (Total)	ND	ND	ND	ND	ND	ND	ND	0.022	n/a	n/a	mg/kg	8260
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	0.011	4.4	18	mg/kg	8260
1,3,5-Trimethylbenzene	ND	ND	ND	0.050	ND	ND	ND	0.011	1,200	n/a	mg/kg	8260
1,3-Butadiene	ND	ND	ND	ND	ND	ND	ND	0.022	0.26	n/a	mg/kg	8260
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	0.011	n/a	6.0	mg/kg	8260
1,3-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	0.011	2,300	n/a	mg/kg	8260
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	0.011	11	6.0	mg/kg	8260
2,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	0.011	n/a	n/a	mg/kg	8260
2-Butanone (MEK)	ND	0.16	0.072	0.021	ND	ND	ND	0.022	19,000	36	mg/kg	8260
2-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	0.011	2,300	n/a	mg/kg	8260
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	0.022	130	n/a	mg/kg	8260
2-Methyl-1,3-butadiene	ND	ND	ND	ND	ND	ND	ND	0.022	n/a	n/a	mg/kg	8260
2-Methylpentane	ND	ND	ND	ND	ND	ND	ND	0.011	n/a	n/a	mg/kg	8260

Table 12. Summary of Total Volatile Organic Compound Results – Solid Samples

Analyte	Sample ID							Reporting Limit[a]	Soil Screening Level[b]	NUTS[c]	Units	Method
	SP-1	SP-4	SP-5	SP-7	SP-9	SP-10	SP-13					
2-Propanol	ND	ND	ND	ND	ND	ND	ND	0.45	24,000	n/a	mg/kg	8260
3-Methylpentane	ND	ND	ND	ND	ND	ND	ND	0.011	n/a	n/a	mg/kg	8260
4-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	0.011	2,300	n/a	mg/kg	8260
Acetone	ND	0.53	0.23	0.054	ND	ND	0.022	0.022	67,000	160	mg/kg	8260
Acetonitrile	ND	ND	ND	ND	ND	ND	ND	0.22	340	38	mg/kg	8260
Acrylonitrile	ND	ND	ND	ND	ND	ND	ND	0.045	1.1	84	mg/kg	8260
Benzene	ND	ND	ND	ND	ND	ND	ND	0.011	5.1	10	mg/kg	8260
Bromobenzene	ND	ND	ND	ND	ND	ND	ND	0.011	180	n/a	mg/kg	8260
Bromochloromethane	ND	ND	ND	ND	ND	ND	ND	0.011	63	n/a	mg/kg	8260
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	0.011	1.3	15	mg/kg	8260
Bromoform	ND	ND	ND	ND	ND	ND	ND	0.011	86	15	mg/kg	8260
Bromomethane	ND	ND	ND	ND	ND	ND	ND	0.011	3	15	mg/kg	8260
Carbon disulfide	ND	0.033	0.0086	ND	ND	ND	ND	0.011	350	n/a	mg/kg	8260
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	0.011	2.9	6.0	mg/kg	8260
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	0.011	130	6.0	mg/kg	8260
Chloroethane	ND	ND	ND	ND	ND	ND	ND	0.011	5,700	6.0	mg/kg	8260
Chloroform	ND	ND	ND	ND	ND	ND	ND	0.011	1.4	6.0	mg/kg	8260
Chloromethane	ND	ND	ND	ND	ND	ND	ND	0.011	46	30	mg/kg	8260
Chloroprene	ND	ND	ND	ND	ND	ND	ND	0.011	0.044	0.28	mg/kg	8260
Cyclohexane	ND	ND	ND	ND	ND	ND	ND	0.011	2,700	n/a	mg/kg	8260
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	0.011	3.3	15	mg/kg	8260
Dibromomethane	ND	ND	ND	ND	ND	ND	ND	0.011	9.8	15	mg/kg	8260
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	0.011	37	7.2	mg/kg	8260
Ethanol	ND	ND	ND	ND	ND	ND	0.96	1.1	n/a	n/a	mg/kg	8260
Ethyl methacrylate	ND	ND	ND	ND	ND	ND	ND	0.022	710	160	mg/kg	8260
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	0.011	25	10	mg/kg	8260
Hexachloro-1,3-butadiene	ND	ND	ND	ND	ND	ND	ND	0.011	5.3	5.6	mg/kg	8260
Isopentane	ND	ND	ND	ND	ND	ND	ND	0.011	n/a	n/a	mg/kg	8260
Isopropylbenzene (Cumene)	ND	ND	ND	0.0057	ND	ND	ND	0.011	990	n/a	mg/kg	8260
Methacrylonitrile	ND	ND	ND	ND	ND	ND	ND	0.22	10	84	mg/kg	8260
Methyl acetate	ND	ND	ND	ND	ND	ND	ND	0.022	120,000	n/a	mg/kg	8260

Table 12. Summary of Total Volatile Organic Compound Results – Solid Samples

Analyte	Sample ID							Reporting Limit[a]	Soil Screening Level[b]	NUTS[c]	Units	Method
	SP-1	SP-4	SP-5	SP-7	SP-9	SP-10	SP-13					
Methyl methacrylate	ND	ND	ND	ND	ND	ND	ND	0.022	1,900	160	mg/kg	8260
Methyl-tert-butyl ether	ND	ND	ND	ND	ND	ND	ND	0.011	210	n/a	mg/kg	8260
Methylcyclohexane	ND	ND	ND	ND	ND	ND	ND	0.022	n/a	n/a	mg/kg	8260
Methylcyclopentane	ND	ND	ND	ND	ND	ND	ND	0.011	n/a	n/a	mg/kg	8260
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	0.011	320	30	mg/kg	8260
Naphthalene	ND	ND	0.0078	ND	ND	ND	ND	0.011	17	5.6	mg/kg	8260
Propionitrile	ND	ND	ND	ND	ND	ND	ND	0.045	n/a	n/a	mg/kg	8260
Styrene	ND	ND	ND	ND	ND	ND	ND	0.011	3,500	n/a	mg/kg	8260
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	0.011	39	6.0	mg/kg	8260
Tetrahydrofuran	ND	ND	ND	ND	ND	ND	ND	0.022	9,600	n/a	mg/kg	8260
Toluene	ND	ND	ND	0.0085	ND	ND	ND	0.011	4,700	10	mg/kg	8260
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	0.011	1.9	6.0	mg/kg	8260
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	0.011	310	30	mg/kg	8260
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	0.0045	1.7	6	mg/kg	8260
Xylene (Total)	ND	ND	ND	ND	ND	ND	ND	0.033	280	30	mg/kg	8260
cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	0.011	230	n/a	mg/kg	8260
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	0.011	8.2	18	mg/kg	8260
m&p-Xylene	ND	ND	ND	ND	ND	ND	ND	0.022	240[d]	n/a	mg/kg	8260
n-Butanol	ND	ND	ND	ND	ND	ND	ND	0.45	12,000	2.6	mg/kg	8260
n-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	0.011	5,800	n/a	mg/kg	8260
n-Heptane	ND	ND	ND	ND	ND	ND	ND	0.011	n/a	n/a	mg/kg	8260
n-Hexane	ND	ND	ND	ND	ND	ND	ND	0.011	250	n/a	mg/kg	8260
n-Pentane	ND	ND	ND	ND	ND	ND	ND	0.022	340	n/a	mg/kg	8260
n-Propylbenzene	ND	ND	ND	0.0058	ND	ND	ND	0.011	n/a	n/a	mg/kg	8260
o-Xylene	ND	ND	ND	0.010	ND	ND	ND	0.011	280	n/a	mg/kg	8260
p-Isopropyltoluene	ND	ND	ND	ND	ND	ND	ND	0.011	n/a	n/a	mg/kg	8260
sec-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	0.011	12,000	n/a	mg/kg	8260
tert-Butyl Alcohol	ND	ND	ND	ND	ND	ND	ND	0.45	n/a	n/a	mg/kg	8260
tert-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	0.011	12,000	n/a	mg/kg	8260
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	0.011	2,300	30	mg/kg	8260
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	0.011	n/a	18	mg/kg	8260

n/a – No applicable limit for analyte.
ND – Analyte not detected.
[a] Maximum reporting limit listed. Some of the samples were analyzed at a lower reporting limit.
[b] November 2014 EPA Regional Screening Level (RSL) Summary Table industrial soil screening levels with a Target Hazard Quotient of 0.1.
[c] Nonwastewater Universal Treatment Standard. See 40 CFR § 268.48.
[d] Screening level is for each analyte.

Table 13. Summary of Total Volatile Organic Compound Results – Liquid Samples

Analyte	Sample ID					Reporting Limit[a]	WUTS[b]	Units	Method
	SP-6	SP-11	SP-12	SP-14	SP-15				
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	ND	0.001	57	µg/L	8260
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	0.0005	54	µg/L	8260
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	0.0005	57	µg/L	8260
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	0.0005	54	µg/L	8260
1,1,2-Trichlorotrifluoroethane	ND	ND	ND	ND	ND	0.001	57	µg/L	8260
1,1-Dichloroethane	ND	ND	ND	ND	ND	0.0005	59	µg/L	8260
1,1-Dichloroethene	ND	ND	ND	ND	ND	0.0005	25	µg/L	8260
1,1-Dichloropropene	ND	ND	ND	ND	ND	0.001	n/a	µg/L	8260
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	0.001	n/a	µg/L	8260
1,2,3-Trichloropropane	ND	ND	ND	ND	ND	0.001	850	µg/L	8260
1,2,3-Trimethylbenzene	ND	ND	ND	ND	ND	0.001	n/a	µg/L	8260
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	0.005	55	µg/L	8260
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	0.001	n/a	µg/L	8260
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	ND	0.001	110	µg/L	8260
1,2-Dibromoethane (EDB)	ND	ND	ND	ND	ND	0.002	28	µg/L	8260
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	0.001	88	µg/L	8260
1,2-Dichloroethane	ND	ND	ND	ND	ND	0.0005	210	µg/L	8260
1,2-Dichloroethene (Total)	ND	ND	ND	ND	ND	0.0005	n/a	µg/L	8260
1,2-Dichloropropane	ND	ND	ND	ND	ND	0.002	850	µg/L	8260
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	0.0005	n/a	µg/L	8260
1,3-Butadiene	ND	ND	ND	ND	ND	0.01	n/a	µg/L	8260
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	0.0005	36	µg/L	8260
1,3-Dichloropropane	ND	ND	ND	ND	ND	0.001	n/a	µg/L	8260
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	0.0005	90	µg/L	8260
2,2-Dichloropropane	ND	ND	ND	ND	ND	0.001	n/a	µg/L	8260
2-Butanone (MEK)	ND	ND	ND	ND	ND	0.002	280	µg/L	8260
2-Chlorotoluene	ND	ND	ND	ND	ND	0.001	n/a	µg/L	8260
2-Hexanone	ND	ND	ND	ND	ND	0.001	n/a	µg/L	8260
2-Methyl-1,3-butadiene	ND	ND	ND	ND	ND	0.01	n/a	µg/L	8260
2-Methylpentane	ND	ND	ND	ND	ND	0.005	n/a	µg/L	8260
2-Propanol	ND	ND	ND	ND	ND	0.2	n/a	µg/L	8260
3-Methylpentane	ND	ND	ND	ND	ND	0.005	n/a	µg/L	8260
4-Chlorotoluene	ND	ND	ND	ND	ND	0.001	n/a	µg/L	8260
Acetone	ND	ND	ND	ND	ND	0.004	280	µg/L	8260
Acetonitrile	ND	ND	ND	ND	ND	0.02	5600	µg/L	8260
Acrylonitrile	ND	ND	ND	ND	ND	0.004	240	µg/L	8260
Benzene	ND	ND	ND	ND	ND	0.0005	140	µg/L	8260
Bromobenzene	ND	ND	ND	ND	ND	0.001	n/a	µg/L	8260
Bromochloromethane	ND	ND	ND	ND	ND	0.001	n/a	µg/L	8260
Bromodichloromethane	ND	ND	ND	ND	ND	0.0005	350	µg/L	8260
Bromoform	ND	ND	ND	ND	ND	0.0005	630	µg/L	8260
Bromomethane	ND	ND	ND	ND	ND	0.0005	110	µg/L	8260
Carbon disulfide[c]	ND	ND	ND	ND	ND	0.001	3800	µg/L	8260

Table 13. Summary of Total Volatile Organic Compound Results – Liquid Samples

Analyte	Sample ID					Reporting Limit[a]	WUTS[b]	Units	Method
	SP-6	SP-11	SP-12	SP-14	SP-15				
Carbon tetrachloride	ND	ND	ND	ND	ND	0.0005	57	µg/L	8260
Chlorobenzene	ND	ND	ND	ND	ND	0.0005	57	µg/L	8260
Chloroethane	ND	ND	ND	ND	ND	0.0005	270	µg/L	8260
Chloroform	ND	ND	ND	ND	ND	0.0005	46	µg/L	8260
Chloromethane	ND	ND	ND	ND	ND	0.0005	190	µg/L	8260
Chloroprene	ND	ND	ND	ND	ND	0.001	57	µg/L	8260
Cyclohexane	ND	ND	ND	ND	ND	0.001	n/a	µg/L	8260
Dibromochloromethane	ND	ND	ND	ND	ND	0.0005	57	µg/L	8260
Dibromomethane	ND	ND	ND	ND	ND	0.001	110	µg/L	8260
Dichlorodifluoromethane	ND	ND	ND	ND	ND	0.001	230	µg/L	8260
Ethanol	ND	ND	ND	ND	ND	0.5	n/a	µg/L	8260
Ethyl methacrylate	ND	ND	ND	ND	ND	0.002	140	µg/L	8260
Ethylbenzene	ND	ND	ND	ND	ND	0.0005	57	µg/L	8260
Hexachloro-1,3-butadiene[c]	ND	ND	ND	ND	ND	0.001	55	µg/L	8260
Isopentane	ND	ND	ND	ND	ND	0.005	n/a	µg/L	8260
Isopropylbenzene (Cumene)	ND	ND	ND	ND	ND	0.001	n/a	µg/L	8260
Methacrylonitrile	ND	ND	ND	ND	ND	0.02	240	µg/L	8260
Methyl acetate	ND	ND	ND	ND	ND	0.002	n/a	µg/L	8260
Methyl methacrylate	ND	ND	ND	ND	ND	0.002	140	µg/L	8260
Methyl-tert-butyl ether	ND	ND	ND	ND	ND	0.0005	n/a	µg/L	8260
Methylcyclohexane	ND	ND	ND	ND	ND	0.002	n/a	µg/L	8260
Methylcyclopentane	ND	ND	ND	ND	ND	0.005	n/a	µg/L	8260
Methylene Chloride[d]	ND	ND	ND	ND	ND	0.0005	89	µg/L	8260
Naphthalene	ND	ND	ND	ND	ND	0.001	59	µg/L	8260
Propionitrile	ND	ND	ND	ND	ND	0.016	240	µg/L	8260
Styrene	ND	ND	ND	ND	ND	0.001	n/a	µg/L	8260
Tetrachloroethene	ND	ND	ND	ND	ND	0.0005	56	µg/L	8260
Tetrahydrofuran	ND	ND	ND	ND	ND	0.004	n/a	µg/L	8260
Toluene	ND	ND	ND	ND	ND	0.0005	80	µg/L	8260
Trichloroethene	ND	ND	ND	ND	ND	0.0005	54	µg/L	8260
Trichlorofluoromethane	ND	ND	ND	ND	ND	0.0005	20	µg/L	8260
Vinyl chloride	ND	ND	ND	ND	ND	0.0005	270	µg/L	8260
Xylene (Total)	ND	ND	ND	ND	ND	0.003	320	µg/L	8260
cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	0.001	n/a	µg/L	8260
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	0.0005	36	µg/L	8260
m&p-Xylene	ND	ND	ND	ND	ND	0.002	n/a	µg/L	8260
n-Butanol	ND	ND	ND	ND	ND	0.2	5600	µg/L	8260
n-Butylbenzene	ND	ND	ND	ND	ND	0.001	n/a	µg/L	8260
n-Heptane	ND	ND	ND	ND	ND	0.005	n/a	µg/L	8260
n-Hexane	ND	ND	ND	ND	ND	0.001	n/a	µg/L	8260
n-Pentane	ND	ND	ND	ND	ND	0.01	n/a	µg/L	8260
n-Propylbenzene	ND	ND	ND	ND	ND	0.001	n/a	µg/L	8260
o-Xylene	ND	ND	ND	ND	ND	0.001	n/a	µg/L	8260
p-Isopropyltoluene	ND	ND	ND	ND	ND	0.001	n/a	µg/L	8260
sec-Butylbenzene	ND	ND	ND	ND	ND	0.001	n/a	µg/L	8260

Table 13. Summary of Total Volatile Organic Compound Results – Liquid Samples

Analyte	Sample ID					Reporting Limit[a]	WUTS[b]	Units	Method
	SP-6	SP-11	SP-12	SP-14	SP-15				
tert-Butyl Alcohol	ND	ND	ND	ND	ND	0.2	n/a	µg/L	8260
tert-Butylbenzene	ND	ND	ND	ND	ND	0.001	n/a	µg/L	8260
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	0.0005	54	µg/L	8260
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	0.0005	36	µg/L	8260

n/a – No applicable limit for analyte.
ND – Analyte not detected.
[a] Maximum reporting limit listed. Some of the samples were analyzed at a lower reporting limit.
[b] Wastewater Universal Treatment Standard. See 40 CFR § 268.48.
[c] RPD value was outside control limits.
[d] Common Laboratory Contaminant.

Table 14. Summary of Total Petroleum Hydrocarbon Results – Solid Samples

Analyte	Sample ID	Reporting Limit[a]	Units	Method
	SP-13			
Gasoline Range Organics	ND	2,690	µg/kg	8015
Diesel Range Organics [c]	723	19.8	mg/kg	8015
Oil Range Organics	1,270	99.1	mg/kg	8015

ND – Analyte not detected.

Table 15. Summary of Total Petroleum Hydrocarbon Results– Liquid Samples

Analyte	Sample ID			Reporting Limit[a]	Units	Method
	SP-11	SP-14	SP-15			
Gasoline Range Organics	ND	ND	ND	50	µg/L	8015
Diesel Range Organics [c]	ND	ND	0.43	0.25	mg/L	8015
Oil Range Organics	ND	ND	0.84	0.5	mg/L	8015

n/a – No applicable limit for analyte.
ND – Analyte not detected.
[a] Maximum reporting limit listed. Some of the samples were analyzed at a lower reporting limit.
[b] Wastewater Universal Treatment Standard. See 40 CFR § 268.48.
[c] Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample recovery.

Table 16. Summary of pH Results – Liquid Samples[a]

Analyte	Sample ID				Reporting Limit[b]	Units	Method
	SP-2	SP-8	SP-11	SP-12			
pH	3.6	2.4	10.3	10.4	0.010	Std. Units	SM 4500 HB

[a] All samples exceeded hold times.
[b] Maximum reporting limit listed. Some of the samples were analyzed at a lower reporting limit.

Table 17. Flash Point Results – Liquid Samples

Analyte	Sample ID		Reporting Limit	Units	Method
	SP-11	SP-12			
Flashpoint	>212	>212	75.0	deg F	1010

Attachment A

PHOTOGRAPH LOG

DATE TAKEN: 8/27/2015	
TAKEN BY: J. Watson	**SITE LOCATION:** 90 day storage area, Tank 68
PHOTO #: 1 **COMMENTS:** SP-1 Chris Krejci collecting an EnCore sample of the Tank 68 grit stored in a roll-off bin in the 90 day storage area at the Wilmington Refinery.	

DATE TAKEN: 8/27/2015	
TAKEN BY: J. Watson	**SITE LOCATION:** Selenium roll off area
PHOTO #: 2 **COMMENTS:** SP-2 Chris Krejci collecting a liquid sample directly into the sample containers beneath the roll-off bin in the Selenium Plant area of the Wilmington Refinery.	

DATE TAKEN: 8/27/2015	
TAKEN BY: C. Krejci	**SITE LOCATION:** Selenium roll off area
PHOTO #: 3 **COMMENTS:** SP-3 John Schofield collecting a solids sample using an extension pole for collection prior to splitting into individual aliquots from the selenium roll off area.	

DATE TAKEN: 8/27/2015	
TAKEN BY: J. Schofield	**SITE LOCATION:** Northwest corner of Pond SBU-2 (F-7)
PHOTO #: 4 **COMMENTS:** SP-4 Chris Krejci collecting an EnCore sample from the northwest corner of Pond SBU-2 (F-7).	

DATE TAKEN: 8/27/2015	
TAKEN BY: C. Krejci	**SITE LOCATION:** Southwest Corner of SBU-2 (F-7)
PHOTO #: 5 **COMMENTS:** SP-5 Solids collected from southwest corner of Pond SBU-2 (F-7).	

DATE TAKEN: 8/27/2015	
TAKEN BY: J. Watson	**SITE LOCATION:** Drum Solids – From Tank 42
PHOTO #: 6 **COMMENTS:** SP-7 Solids inside a drum labeled as Tank 42.	

DATE TAKEN: 8/27/2015	
TAKEN BY: J. Watson	**SITE LOCATION:** Selenium Plant
PHOTO #: 7 **COMMENTS:** SP-8 Chris Krejci collecting a liquid sample directly into the sample container from water inside a secondary containment wall in the selenium plant. Due to low water levels, a stainless steel trowel was used to push liquid into the sample bottles.	

DATE TAKEN: 8/27/2015	
TAKEN BY: J. Watson	**SITE LOCATION:** Shaker building
PHOTO #: 8 **COMMENTS:** SP-9, SP-10 Site personnel collecting petroleum coke from shaker using a scoop; Chris Krejci collecting from the scoop using a stainless steel spoon and placing the sample into sample containers.	

DATE TAKEN: 8/28/2015	
TAKEN BY: J. Watson	**SITE LOCATION:** Pond water outfall
PHOTO #: 9 **COMMENTS:** SP-11, SP-12 Chris Krejci measuring the pH of the pond water outfall	

DATE TAKEN: 8/28/2015	
TAKEN BY: J. Watson	**SITE LOCATION:** Pond water outfall
PHOTO #: 10 **COMMENTS:** SP-13 Sediment collected under the pond outfall.	

Attachment B

QUALITY ASSURANCE/QUALITY CONTROL DISCUSSION

Pace Analytical was selected as the laboratory for these analyses because it operates NELAC certified laboratories for the selected EPA-approved methods used in this sampling episode.

For this sampling episode, ERG followed all Quality Assurance Project Plan sampling requirements.

Sample Receipt Condition

All samples were received in accordance with EPA protocol with one exception: routine initial sample volume or weight was not used for extraction, resulting in elevated reporting limits for SP-9, and SP-10.

Holding Times

All holding times were met with the following exceptions:

- Sample was received for analysis requested beyond the recognized method holding time for SP-2 and SP-8;
- EnCore samples were outside of the holding period.
- Analysis initiated outside of the 15 minute EPA recommended holding time for pH for SP-2 and SP-8.
- Sample was received or analysis requested beyond the recognized method holding time for SP-11 and SP-12.
- Analysis initiated outside of the 15 minute EPA recommended holding time for pH SP-11 and SP-12.

Laboratory Control Samples

All analytes measured in the method blanks were below the reporting limit other than the following:

- Calcium was detected in the associated method blank. (Lab ID: 153272)
- Mercury was detected in the associated method blank. (Lab ID: 153272)

Matrix Spikes and Duplicates

All percent recoveries and RPDs were within acceptance criteria except for the following:

TCLP Metal Analyses

- Matrix spike recovery exceeded QC limits for Calcium and Thallium. Batch accepted based on laboratory control sample (LCS) recovery.

TOTAL METALS

- Matrix spike recovery exceeded QC limits for the following analytes:
    - Aluminum
    - Antimony
    - Barium
    - Calcium
    - Iron
    - Lead
    - Magnesium
    - Manganese
    - Potassium
    - Thallium

DRO ORO ORGANIC

- Surrogate recovery outside laboratory control limits included:
    - o-Terphenyl (S)
    - n-Pentacosane (S)

- Surrogate recovery outside control limits due to matrix interferences (not confirmed by re-analysis):
    - n-Pentacosane (S)

- Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery:
    - Diesel Range Organic (C10-C28)

- RPD value was outside control limits:
    - Diesel Range Organic (C10-C28)

7471 MERCURY

- Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
    - Mercury

MSSV SEMIVOLATILES

- Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
    - Hexachlorocyclopentadiene

TCLP CLLE

- Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery
    - Pyridine
- RPD value was outside control limits
    - 2,4,5-Trichlorophenol

MSV 5035 LOW LEVEL RESULTS

- Surrogate recovery outside laboratory control limits.
    - 4-Bromofluorobenzene (S)
    - Toluene-d8 (S)
- Surrogate recovery exceeded laboratory control limits. Analyte presence below reporting limits in associated samples. Results unaffected by high bias.
    - Dibromofluoromethane (S)
    - Toluene-d8 (S)
    - SP-9 (Lab ID: 2024867009)
    - 4-Bromofluorobenzene (S)
    - Dibromofluoromethane (S)
    - Toluene-d8 (S)

- Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

1,1,1,2-Tetrachloroethane	1,3-Dichlorobenzene	Chloroprene	n-Butylbenzene
1,1,2,2-Tetrachloroethane	1,3-Dichloropropane	cis-1,2-Dichloroethene	n-Propylbenzene
1,1,2-Trichloroethane	1,4-Dichlorobenzene	cis-1,3-Dichloropropene	o-Xylene
1,1-Dichloroethane	2-Chlorotoluene	Dibromochloromethane	p-Isopropyltoluene
1,1-Dichloropropene	2-Hexanone	Dibromomethane	sec-Butylbenzene
1,2,3-Trichlorobenzene	4-Chlorotoluene	Ethyl methacrylate	Styrene
1,2,3-Trichloropropane	Benzene	Ethylbenzene	tert-Butylbenzene
1,2,4-Trichlorobenzene	Bromobenzene	Hexachloro-1,3-butadiene	Tetrachloroethene
1,2,4-Trimethylbenzene	Bromochloromethane	Isopropylbenzene (Cumene)	Toluene
1,2-Dibromo-3-chloropropane	Bromodichloromethane	m&p-Xylene	trans-1,2-Dichloroethene
1,2-Dibromoethane (EDB)	Bromoform	Methyl methacrylate	trans-1,3-Dichloropropene
1,2-Dichlorobenzene	Bromomethane	Methylene Chloride	Trichloroethene
1,2-Dichloroethane	Carbon disulfide	MSD (Lab ID: 152150)	1,1,1,2-Tetrachloroethane
1,2-Dichloropropane	Chlorobenzene	MSD (Lab ID: 152875)	Dibromomethane
1,3,5-Trimethylbenzene	Chloroform	Naphthalene	Hexachloro-1,3-butadiene
			sec-Butylbenzene

- RPD value was outside control limits.

1,1,2,2-Tetrachloroethane	Acrylonitrile	tert-Butylbenzene
1,1,2-Trichloroethane	Benzene	Tetrachloroethene
1,1-Dichloroethane	Bromodichloromethane	Tetrahydrofuran
1,1-Dichloropropene	Chloroform	Toluene
1,2,3-Trichloropropane	Chloroprene	trans-1,2-Dichloroethene
1,2-Dibromo-3-chloropropane	cis-1,2-Dichloroethene	Trichloroethene
1,2-Dichloroethane	Dibromochloromethane	1,1,1,2-Tetrachloroethane
1,2-Dichloropropane	Methyl acetate	Acetone
Acetonitrile	Methyl methacrylate	Isopropylbenzene (Cumene)

MSV LOW LEVEL RESULTS

- RPD value was outside control limits
  - Carbon disulfide
  - Hexachloro-1,3-butadiene
- Common Laboratory Contaminant
  - Methylene Chloride

MSV TCLP RESULTS

- Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
  - 2-Butanone (MEK)

- Benzene

MET ICPMS RESULTS

- Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
  - Barium
  - Iron
  - Magnesium
  - Manganese
  - Copper

Conclusion

Despite the issues listed above, the analytical data provided by the laboratory are acceptable for use in this report based on ERG's review.

Attachment C

CHAIN-OF-CUSTODY FORMS

Pace Analytical

CHAIN-OF-CUSTODY / Analytical F

The Chain-of-Custody is a LEGAL DOCUMENT. All rel

WO# : 2024867

2024867

1

Section A — Required Client Information:

Company:	Eastern Research Group Inc.
Address:	141 S. Rolling Road
	Springfield, PA 19064
Email:	joe.watson@erg.com
Phone:	703-633-1637 Fax:
Requested Due Date:	

Section B — Required Project Information:

Report To:	Watson, Joe
Copy To:	
Purchase Order #:	
Project Name:	U.S. EPA Long Beach, CA G/D/O
Project #:	

Section C — Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote:	
Pace Project Manager:	craig.mccollum@pacelabs.com,
Pace Profile #:	5699

Regulatory Agency

State / Location: GA

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / ,) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	TPH DRO/ORO	TPH as Gasoline	8260	8270	6010/6020/7470	8260 TCLP	8270 TCLP	6010/6020/7470 TCLP	HP	Residual Chlorine (Y/N)	
1	SP-1	SL	G	8/27	10:05			3.9	9	✓										✓	✓	✓	✓	✓	✓	✓		Conductivity
2	SP-2	WW	G	"	11:33			3.9	3	✓		✓										✓			✓	✓		only will perform
3	SP-3	SL	G	"	11:35			3.9	3	✓												✓			✓			analysis
4	SP-4	SL	G	"	14:51			3.9	9	✓										✓	✓	✓	✓	✓	✓	✓		
5	SP-5	SL	G	"	15:10			3.9	9	✓										✓	✓	✓	✓	✓	✓	✓		
6	SP-6	WW	G	"	15:31			3.9	6	✓		✓								✓	✓							
7	SP-7	SL	G	"	17:28			3.9	9	✓										✓	✓	✓	✓	✓	✓	✓		
8	SP-8	WW	G	"	18:30			3.9	3	✓		✓										✓			✓	✓		
9	SP-9	SL	G	"	19:00			3.9	9	✓										✓	✓	✓	✓	✓	✓	✓		
10	SP-10	SL	G	"	19:10			3.9	9	✓										✓	✓	✓	✓	✓	✓	✓		
11																												
12																												

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
	Joseph Watson	8/28/15	6:50	Pace Labs	8/28	6:50
	Pace Labs	8/28/15	6:50	FedEx		
	FedEx	8/29/15	9:20		8/29/15	920

SAMPLE CONDITIONS

TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
1.1			
1.8	Y	Y	Y
2.2			

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed:

CHAIN-OF-CUSTODY / Analytical Request Do

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must

WO# : 2024937

2024937

Page : 1 Of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Eastern Research Group Inc.	Report To:	Watson, Joe	Attention:	
Address:	141 S. Rolling Road	Copy To:		Company Name:	
Springfield, PA 19064				Address:	
Email:	~~Clien~~ joe.watson@erg.com	Purchase Order #:		Pace Quote:	
Phone:	703-633-1637 Fax:	Project Name:	U.S. EPA Long Beach, CA	Pace Project Manager:	craig.mccollum@pacelabs.com,
Requested Due Date:	9/11/15	Project #:		Pace Profile #:	5699 L-11

Regulatory Agency

State / Location: CA

Requested Analysis Filtered (Y/N):

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	VOC by 8260	TCLP-VOC,SVOC,Metals(*	SVOC 8270	pH by 9040/Flash Point 101	Metals by 6020	SVOC 8270	Metals by 6010	TCLP-VOC, SVOC,Metals (*	VOC	pH Soil - 9045	TPH DRO/8015	TPH 8260	Residual Chlorine (Y/N)	
1	SP-11		G	8/28	09:13			5.2°C	1										✓	✓	✓	✓	✓					✓	✓		Mercury, particle
2	SP-12		G	"	09:40			5.2°C	5										✓	✓	✓	✓	✓					✓	✓		Metals, cadmium
3	SP-13		G	"	10:20			5.2°C	5										✓	✓	✓				✓			✓	✓		
4	SP-14		G	"	10:46			5.2°C	3										✓		✓		✓					✓	✓		
5	SP-15		G	"	13:38			5.2°C	10										✓		✓		✓					✓	✓		
6																															
7																															
8																															
9																															
10																															
11																															
12																															

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Joseph Watson ERG	8/29/15	7:00am	Jyrsat Pace Analytical	8/29/15	7:00				
	Jyrsat PaceLabs	8/31/15		FedEx						
	FedEx	9-1-15	830	ADC	9-1-15	830	1.5	Y	Y	Y
							2.1			
							TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed: